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ABSTRACT

In interlanguage, the transitional state reaching from one's native language to a given target language, phonological, morphological, syntactic, lexical, sociocultural, or psycholinguistic errors may be generated and systematized by the process of fossilization. Depending on the amount of time needed for remediation, fossilized features may be either "hard" or "soft." Fossilization may arise from the application of false learner hypotheses, or it may have neurolinguistic, socio-affective, or instructional origins. Language learning strategies are devices used to process incoming target language data in instructional situations, and are thought to facilitate deep cognitive processing and, as a result, more thorough learning. The relationship between fossilization and learning strategies has received minimal scholarly attention. However, the literature of learning strategies suggests a shift of pedagogical focus from language teachers to language learners. The proposed relationship of fossilization and learning strategies, given a cognitive frame of reference, could be a key to the remediation of systematized errors, as the role of learner information processing in the second language acquisition process becomes more clearly understood. Further research is needed on the following: time required to identify and replace erroneous/misapplied hypotheses, application of compensatory techniques, or improvement of motivation; transfer of learning strategies across languages; and joint operation of metacognitive strategies. (Author/MSE)

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Fossilization and learning strategies in second language acquisition*

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In interlanguage, the transitional state reaching from one's native language to a given target language, phonological, morphological, syntactic, lexical, socio-cultural, or psycholinguistic errors may be generated and systematized by the process of fossilization. Depending on the amount of time needed for remediation, fossilized features may be considered either "hard" or "soft." Fossilization may arise from the application of false learner hypotheses, or it may have neuro-linguistic, socio-affective, or instructional origins. Language learning strategies are devices which are employed to process incoming target language data in instructional situations, and which are thought to facilitate deep cognitive processing, hence more thorough learning. Such strategies may be metacognitive (involving reflection on the learning process, planning for learning, monitoring the learning task, and evaluating performance), cognitive (involving mental or physical interaction with the material to be learned, or the application of a specific technique to a given learning task), or socio-affective (interaction with another person or the use of affective controls to facilitate a learning task). Proceeding from a sampling of the literature, links between fossilization and language learning strategies are suggested, as are implications for pedagogical praxis and an agenda for further research.

FOSSILIZATION

According to psycholinguist John Schumann, a major difference between the processes of first and second language acquisition is that all normal human beings achieve proficiency in their native language, yet exhibit great variation in the degree to which they acquire second languages (Schumann, 1975). This variation among second language learners has been studied from varied perspectives. One especially rewarding line of inquiry is enunciated in Corder's "The Significance of Learners' Errors" (1967), in which the author suggests that a central task of a second-language learner is to test the following hypotheses: "Are the systems of the new language the same or different from those of the language I know?"

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* In this discussion, the terms "second language learning" and "second language acquisition" will be used interchangeably.

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and "(I)f different, what is their nature?". Further, Corder maintains that a deeper understanding of hypothesis testing in the second language acquisition process could be gained from analysis of the systematic errors committed by learners (as opposed to random "mistakes" made by speakers of any language) along the continuum from their native language to a given target language.

Proceeding from Corder (among others), Selinker (1972) has developed the concept of "interlanguage" (IL) to more clearly describe the learner's transition from native language (NL) to target language (TL). In his description of interlanguage, Selinker addresses the problem of non-random learner errors which tend to recur in one's IL, despite attempts at eradication. The process by which such persistent, systematic interlingual errors are generated is called "fossilization," around which topic the present discussion will revolve.

Definitions and perspectives

In general terms (see Selinker, 1972), fossilizable phenomena are language features, rules, or subsystems (phonological, morphological, syntactic, lexical, socio-cultural, or psycholinguistic in nature) which speakers of a given NL tend to preserve in their interlanguage *en route* to a particular TL. One might suggest two disparate perspectives concerning the relative permanence of fossilized features. A "hard" perspective would see fossilized features as being, for all practical purposes, irremediable. No amount of explanation or instruction in the TL would appear to make much difference. On the other hand, a "soft" perspective might represent fossilization in terms of learning plateaus, where development of given TL features is simply "arrested" or "inhibited" for shorter or longer periods of time, depending on changes in instruction or learner attitude/motivation (as suggested by Canale, 1987).

In the face of such a distinction however, there is much intuitive appeal in the broader notion that the "hard" and "soft" views of fossilization really represent varying degrees of the same thing. At one end of the spectrum, fossilized features would seem but moderately tenacious, whereas at the other end, such features would appear resistant to most every sort of remedial effort. The key to "hardness" or "softness" in this broader view of fossilization seems to be *time* . In other words, degree of fossilization may be described in terms of the relative amount of time necessary for remediation of systematic errors in interlingual development. If a systematized IL error requires more remediation time than is practically available, it could be considered an example of "hard fossilization." Conversely, if a systematized error requires relatively less time to be eradicated, it could be considered an example of "soft fossilization." Whether fossilization is perceived as soft, hard, or immutable, it might prove useful to turn to an assortment of general perspectives.

Beginning with Corder (1967), much attention has been paid to the notion that second language learning consists mainly in the testing of learner hypotheses. If in fact hypothesis testing is one of the most central processes in second language acquisition, where might the fossilization concept be applied? Recall Corder's suggestion that learner hypotheses are chiefly concerned with the degree of similarity or difference between a learner's NL and the TL in question. One might argue then, that if a given learner has formed an incorrect hypothesis during interlingual development (that is, if one has perceived a similarity between NL and TL which is not really there), the potential for systematic error is immediately introduced. If the same learner attempts to apply such an ill-conceived hypothesis, an error of production will result in that learner's IL. Further, if the incorrect hypothesis is not replaced with one which is more nearly in line with the TL norm, the attendant production error will fossilize, that is, be systematized in the learner's IL.

There are other perspectives, of course. According to a number of scholars (among them Jakobovits, 1970; Selinker & Lamendella, 1978; Walsh & Diller, 1981), neurolinguistic factors may play a role in the fossilizability of features in IL. As learners grow older, it is argued, there may be a "loss of plasticity" in the brain, which could well ensure that numerous TL norms will never be achieved. This notion might account, by way of example, for the familiar "foreign accent" phenomenon (fossilization of IL phonological features) in most adult second language learners.

Attitude and motivation are widely considered critical factors in second language acquisition. A number of recent studies have linked these two factors (either explicitly or implicitly) with fossilization. For example, in her discussion of second language learners and risk-taking behavior, Beebe (1983) maintains that as a result of risk-taking situations where learners perceive high risk/low gain, IL structures can fossilize. That is, learners experience a *motivational crisis* because they adjudge a certain kind of situation to be a poor gamble; hence they will not attempt TL features of which they are unsure. Consequently, learning (with regard to these uncertain features) stops at a certain point in IL. Beebe notes a related phenomenon among learners living temporarily abroad, such as missionaries or Peace Corps volunteers, who tend to master the minimal TL corpus requisite for comfortable existence in their impermanent surroundings. Once mastery of this minimal corpus is complete, acquisition effectively stops. Beebe suggests that this sort of fossilization may be related to learners' unwillingness to take further risks. In a related study of competitiveness and anxiety, Bailey (1983) opines that IL development may be inhibited (i.e., features may fossilize) by high levels of stress stemming from the need to function in a second language at a performance level higher than one is really able to maintain. Consequently, learning can be drastically impeded, or may even cease.

On the other hand, such a cessation of learning (resulting in fossilized IL features) may not necessarily involve risk-taking or stress at all. Selinker (1972) refers to what has been called a "strategy of communication." According to Selinker, the suggestion proceeds from Chomsky's notion of "linguistic competence" (one's language capability, as distinguished from "linguistic performance," one's actual language output): When a second language learner determines that no more TL need be acquired for communication, learning stops. Similarly, Terrell (1988) has formulated a "communicative needs hypothesis," which "claims that the degree of communicative need determines the level of attainment in the target language," that is, "those who fossilize at low levels (in their IL) have fewer and less complex communicative demands than those who . . . acquire a richer and more expressive version of the target language."

In a fairly broad survey of affective factors involved in second language learning, Schumann (1975) stresses the importance of one's incipient relationship with the target language and its culture. In natural settings (and possibly in certain classroom settings) a language learner (as "alien") must undergo a process of "dealienation" or "redomestication." During the process, the learner will suffer three types of disorientation: *language shock*, *culture shock*, and *culture stress*. Language shock involves problems of correctly identifying referents, dealing with dissimilarities between NL and TL visual images, and general feelings of shame or inadequacy. Culture shock is, quite simply, the anxiety inherent in a learner's dealings with a new culture. Culture stress centers around long-term questions of personal identity. Any one of these disorientations might engender negative attitudes toward oneself and the target language and culture, inhibit the processes of language learning and acculturation, and ultimately result in fossilized linguistic and socio-cultural features.

Culture is also the prime factor in Terrell's (1988) "target language group identification (TLGI) hypothesis," in which a learner wishing to reap all the benefits of membership in a new culture must desire to become an indistinguishable member of the TL social group. Since, for numerous reasons, most adult second language learners would not tend to fit this category, the TLGI hypothesis predicts that in general, adult learners will fossilize far short of targeted (linguistic and cultural) norms.

Fossilization can play a role in the consideration of second language teaching methodologies, as well. In their article "The Push Toward Communication," Higgs and Clifford (1982) discuss fossilization with regard to those learners at Government language schools who appear to be hopelessly stranded on various sorts of developmental plateaus. Higgs and Clifford have designated such learner types "terminal" cases, attributing this phenomenon to linguistic "proactive interference," where the prior learning of language task A interferes with the subsequent learning of language task B. They note further that, in their experience, the terminal pro-

file is typically "high vocabulary/low grammar," suggesting that these learners have been affected by prior language experience of some informal nature (language task A), such as "street" learning in the target culture, which then inhibits their progress in formal classroom instruction (language task B). Further, Higgs and Clifford suggest that proactive interference might also be a factor in contemporary approaches to second language teaching which place a premium on communication, often at the expense of accuracy. They reason that, under such methodologies, learners will tend to fossilize at relatively low levels, because systematic errors in their IL will usually go unremediated.

Another aspect of the fossilization question is suggested by recent discussions in the second language literature focussing upon "language learning strategies." Their possible relationship with fossilization (see III. below) will be explored subsequent to a brief consideration of the learning strategies concept itself.

LEARNING STRATEGIES

To facilitate second language acquisition in a classroom situation, learners employ numerous devices, frequently called "language learning strategies." The primary function of such strategies is to enable learner comprehension, memory, and use of new language information and skills (Cohen, 1988; Chamot & Küpper, 1989; Oxford, Lavine, & Crookall, 1989).

The concept of learning strategies has appeared under sundry guises. By way of example: Corder (1967) uses the phrase "strategies of learning" to refer to the process of hypothesis testing which learners carry out with regard to the nature of their first and second languages. Tarone (1983) regards learning strategies as one's attempts to develop TL linguistic and sociolinguistic competences which may then be incorporated into one's IL. In her Freirean, problem-posing approach to language curriculum, Crawford-Lange (1981, 1987) addresses learning strategies as devices which arise from the dialogical relationship between teacher and student. Through these and an array of other perspectives (e.g., Beebe,1983; Bialystok, 1979, 1983; Chaudron, 1988; Færch, 1985; Seliger, 1983; Selinker, 1972; Wenden, 1986; Wesche, 1979), there runs a common thread: the manner in which learners think and behave in order to deal with incoming TL data in instructional situations.

Research suggests that learning strategies operate on several levels (Oxford, 1986; Chaudron, 1988; Chamot & Küpper, 1989). A number of investigators have developed detailed taxonomies of language learning strategies (O'Malley, et al., 1985a; Oxford, 1986; Wenden, 1986; Oxford, Lavine, & Crookall, 1989; and others). One such taxonomy has been constructed by Chamot and Küpper (1989), and is divided into sections for *cognitive, metacognitive,* and *socio-affective* strategic behaviors (an abbreviated adaptation of the taxonomy is appended).

Typically, cognition refers to procedures which the mind uses to process information, that is, recognizing, remembering, thinking, problem-solving, and so forth. In second language learning, one might relate cognition to the processing of verbal and/or visual input which language learning tasks might require. Chamot and Küpper (1989) describe cognitive learning strategies in terms of interactions with the material to be learned, which may involve mental or physical manipulation, or the application of a specific technique, en route to completion of given learning tasks. A typical cognitive strategy is "inferencing," where prior knowledge and other available information are used to deduce meaning/usage of unfamiliar components in a given language task, to predict outcomes, or to supply information which is missing (Bialystok, 1983; Chamot & Küpper, 1989).

In general terms, metacognition is thinking about thinking (Glover & Bruning, 1987). In the realm of second language acquisition, metacognition would involve learners' thoughts about the process of their own second language learning. Metacognitive learning strategies include behaviors, largely self-regulatory, which involve reflection on the learning process, planning for learning, monitoring of learning tasks, and evaluation of performance (Chamot & Küpper, 1989). Metacognitive strategies would relate then, to one's self-questions: "How do I learn languages? What sorts of things help me learn best? How am I doing with this task? How did I do on the task I just completed?" For example, in the Chamot and Küpper taxonomy, a metacognitive self-evaluation strategy would involve checking one's work when the task was finished, and then evaluating: 1) one's overall performance of the task, 2) one's ability to perform the task, 3) the strategies one has used, and 4) how much one really knows of the TL at any given level (word, phrase, etc.).

Socio-affective learning strategies might include interaction with another (likely a teacher or peer) to expedite learning, or the use of affective control over one's own learning behavior. Typically, one might ask another for verification, explanation, or feedback on one's own performance; or one might use techniques for one's own anxiety-reduction and self-reinforcement (Chamot & Küpper, 1989; Oxford, Lavine & Crookall, 1989).

Having briefly discussed the concept of "language learning strategies" and noted some typical strategic categories and types, a logical question would be: "How might learning strategies facilitate language acquisition?"

Strategies and cognition

One answer arises from information-processing theory in cognitive psychology (Wesche, 1979; Cohen, 1988). It has been suggested that memory is a function of *depth of processing* , that is, the more deeply or carefully learners analyze new information, the more likely that information may be recalled over time (Glover & Bruning, 1987). Processing and anal-

ysis make information more *distinctive* in its context, hence more easily recalled. A related idea is that of *elaboration* : As learners use more and more varied methods of encoding new information, memory and recall of that information should improve. The key to memory as related to depth of processing, distinctiveness, and elaboration is what learners actually *do* with the material they are attempting to learn.

The application of more and varied learning strategies to given tasks (elaboration) would result in deeper processing and greater contextual distinctiveness, hence more accurate and thorough learning. Cohen (1988) suggests that it is elaborate processing which causes TL "input" (teacher presentation, explanations, gestures, materials, student questions, etc.) to become "intake" (comprehension of TL data leading to learning). Consequently, IL features arising from the successful application of language learning strategies should more closely resemble corresponding TL target norms.

The notions having been discussed individually, a relationship between fossilization and language learning strategies may now be proposed.

FOSSILIZATION AND LEARNING STRATEGIES

The relationship between fossilization and learning strategies has received minimal scholarly attention (E. Tarone, personal communication; L. Selinker, personal communication). Proceeding from the discussion of learner hypotheses in Corder (1967), one might suggest that someplace along the IL continuum, inappropriate or misapplied learning strategies could lead to fossilization of some features (phonological, morphological, syntactic, lexical, psycholinguistic, or socio-cultural). Selinker (1972) maintains that systematized errors could likely arise from the use of learning strategies in IL, although the exact nature of the process is not discussed. Cohen (1988) also suggests that the repeated use of unsuccessful strategies (i.e., those strategies which do not enable completion of a given language-learning task) could impede a learner's progress.

One might suggest that the process of "fossilization-through-learning-strategy-use" could operate as follows: A learner has reached some conclusions about effective second language learning, based upon NL metalinguistic awareness, prior NL instruction, current TL instruction, or general knowledge. These conclusions manifest themselves in cognitive, metacognitive, or socio-affective behavior which the learner feels will facilitate learning. So far, so good — but there is evidence for what one might call a "specificity factor" inherent in language learning strategies; that is, learning strategies tend to be task-, context-, situation-, or learner-specific (Chamot & Küpper, 1989; Cohen, 1988; Oxford, 1986; Politzer, 1983; Wenden, 1986). Perhaps then, if a given strategy is inappropriate (e.g., having been derived from another task/context), and is repeatedly applied by a learner (perhaps through ignorance of its inappropriateness), suc-

cessful completion of the language task at hand could tend to be inhibited rather than facilitated. If the inaccurate strategy in question is never identified/remediated, the TL features touched by the strategies could tend to temporarily or permanently (for all practical purposes) fossilize.

The situation might become yet more complex if there were prior instruction in a different foreign language. Based upon previous experience in another TL, the learner may assume that a once-successful strategy will again be successful in the context of instruction in a new TL; but because of the specificity factor, the old is inappropriate for the new. Learning is inhibited, perhaps sufficiently for IL errors to systematize. Similar complexities might arise if any prior instruction were under a substantially different methodology (say, a grammar-translation or audio-lingual approach) than the methodology operant in the current learning situation. If certain strategies were methodology-specific, strategy transfer would be inappropriate. Of course, if prior instruction were in a different TL *and* under a different methodology, chances of strategy misapplication could increase further still.

Research suggests that *frequency* and *type* of strategies used can also affect language learning (Wesche, 1979; Oxford, 1986; Cohen, 1988; Chamot & Küpper,1989; Oxford, Lavine, & Crookall, 1989). For example, in their recent discussion of the Learning Strategies in Foreign Language Instruction Project, Chamot and Küpper (1989) report that higher level learners tend to use more and more varied strategies than lower level learners, and that more effective learners tend to use more and more varied strategy types than less effective learners (which they suggest is in keeping with previous "good learner" research). It would seem to follow, then, that the use of fewer and less diverse strategy types could leave learners in the "less effective" category, perhaps with a number of systematized IL errors still short of TL norms.

Conclusion

Although the discussion of fossilization and learning strategies is, at the moment, chiefly theoretical, it does have some implications for *praxis*. Certainly, the fossilization literature suggests possibilities for understanding the origins of systematized interlingual error. The strategies literature urges a shift of pedagogical focus from language *teachers* to language *learners*. The proposed relationship of fossilization and learning strategies, given a cognitive frame of reference, could be a key to the remediation of systematized errors, as the role of learner information processing in the second language acquisition process becomes more clearly understood.

Of course, much careful thought and investigation will be necessary before any substantial conclusions can be drawn. The possible use of learning strategies to remediate fossilized IL features will require further research, as will the relationship of time with fossilization and language

learning strategies. For example, the tenacity of erroneous or misapplied hypotheses could be described in terms of the time required to identify them and to replace them with accurate hypotheses. In dealing with the neurolinguistic effects of age, the time required to devise and apply compensatory techniques (such as teaching of skills for using kinesthetic memory to deal with the "foreign accent" problem) might be discussed. The amount of effort needed for learners to improve levels of attitude and motivation in regard to target language (and cultural) learning tasks could be described in terms of requisite time. Similarly, fossilization stemming from types of prior learning or from the misapplication of learning strategies might be seen alongside the measure of the time needed for their identification and remediation. Other topics for further research might include: the transfer of learning strategies from L1 to L2 to L3 and the effects of similarities/differences between languages; the joint operation of metacognitive strategies as sort of "strategy monitor;" or the application of the "compensation hypothesis" (Cohen, 1988), where learners lacking adequate TL strategies rely on NL strategies more than they do in NL learning. It will be of great interest to see what practical and theoretical insights might be generated by further research in these areas.

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APPENDIX

Inventory of Language Learning Strategies (adapted from Chamot & Küpper, 1989)

Cognitive strategies:

Repetition (repeating a word or phrase during a language task)
Resourcing (using dictionaries, textbooks, prior work)
Grouping (ordering, classifying or labeling common material in a language task)
Note-taking (writing key words/concepts in short verbal, graphic or numerical form)
Deduction/Induction (applying learned or self-developed TL rules)
Substitution (selecting alternative approaches, plans, words, or phrases)
Elaboration (relating new material to prior knowledge, relating components of new information, making personal associations to new information, etc.)
Summarization (making mental or written precis of task-related language/information)
Translation (verbatim relating of ideas from one language to another)

Transfer (using previously learned linguistic knowledge to facilitate a new language task)
Inferencing (using available information to guess meaning/usage of unfamiliar items, predict outcomes, or fill in missing information)

Metacognitive strategies:
Planning (using advanced organizers, proposing strategies for a given task, anticipating necessary parts, sequence, main ideas, or language functions)
Directed Attention (deciding to attend in general to a learning task; maintaining attention)
Selective Attention (deciding to attend to specific aspects of TL input; attending to input during task)
Self-management (understanding/arranging for conditions requisite to task success; controlling performance to maximize use of prior knowledge)
Self-monitoring (checking, verifying, correcting comprehension / performance during language task)
Problem Identification (explicitly identifying central unresolved facet of task)
Self-evaluation (checking performance outcomes, language repertoire, strategy use, or task abilities)

Socio-affective strategies:
Questioning (requesting explanation, verification, rephrasing about materials or task; self-questioning)
Cooperation (working with peers to solve problems, pool information, check learning task, model an activity or obtain feedback)
Self-talk (using mental techniques to reduce anxiety)
Self-reinforcement (providing motivation by arranging personal rewards for task completion)